

Rec'd PCT/RIO 18 MAY 2005

535,556

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



101535556



(43) International Publication Date  
3 June 2004 (03.06.2004)

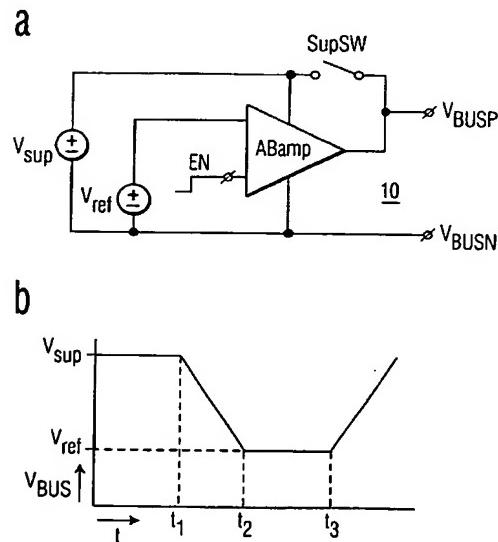
PCT

(10) International Publication Number  
WO 2004/047294 A2

- (51) International Patent Classification<sup>7</sup>: H03K 19/01 (72) Inventor; and  
(75) Inventor/Applicant (for US only): DE LANGEN,  
Klaas-Jan [NL/US]; 1109 McKay Drive, M/S-41SJ, San  
Jose, CA 95131 (US).
- (21) International Application Number: PCT/IB2003/005166 (22) International Filing Date:  
14 November 2003 (14.11.2003)
- (25) Filing Language: English (26) Publication Language: English
- (30) Priority Data:  
60/427,661 18 November 2002 (18.11.2002) US  
60/499,198 27 August 2003 (27.08.2003) US
- (71) Applicant (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL). (71) Applicant (for AE only): U.S. PHILIPS CORPORATION [US/US]; 1251 Avenue of the Americas, New York, NY 10510-8001 (US).
- (74) Common Representative: KONINKLIJKE PHILIPS ELECTRONICS N.V.; c/o LESTER, Shannon, 1109 McKay Drive, M/S-41SJ, San Jose, CA 95131 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: TURN-ON BUS TRANSMITTER WITH CONTROLLED SLEW RATE



(57) Abstract: An amplifier/driver (40) for a bus has an output transistor (M1) that is controlled by a controlled current source (I1). In a quiescent state, the output transistor is configured as part of a current mirror (M1, M11) that maintains a gate-source voltage on the output transistor above the threshold voltage of the output transistor, thereby providing a fast turnon turn-on time. In an active state, the controlled current source provides a substantially constant current to the output transistor to achieve a controlled slew-rate, then reduces the current to the output transistor when a desired output voltage level is achieved. To improve power efficiency, a second controlled current source (I2) provides current to the output load when the desired output voltage level is achieved. To minimize transients, a class-AB control circuit (710) provides a minimum bias current to the output transistor, to prevent it from turning off when the desired output voltage level is achieved.

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**Declaration under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ,*

*TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

**Published:**

- *without international search report and to be republished upon receipt of that report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

Rec'd PCT/PTO 18 MAY 2005

International Application No.

PCT/EP 03/05166

10/555056

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 H03K19/003 H03K17/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H03K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, IBM-TDB

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 281 730 B1 (VU HA CHU) 28 August 2001 (2001-08-28)	1,12-15
A	column 3, line 39 - column 7, line 67; figures 1-3	3,4,10, 11
X	EP 0 575 676 A (PIONEER DIGITAL DESIGN CENTRE) 29 December 1993 (1993-12-29)	1,17
A	column 8, line 7 - column 9, line 41; figures 4a-4c	3,6
X	US 4 825 099 A (BARTON STEVEN K) 25 April 1989 (1989-04-25)	1
A	column 2, line 61 - column 4, line 68; figures 1,2	3
A	US 5 021 730 A (SMITH MICHAEL D) 4 June 1991 (1991-06-04)	1,2
	column 3, line 27 - line 59; figure 1	
	-/-	

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the International search

24 August 2004

Date of mailing of the International search report

02/09/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Feuer, F

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/05166

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) & JP 07 146726 A (OKI ELECTRIC IND CO LTD), 6 June 1995 (1995-06-06) abstract -----	1,2

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/03/05166

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 6281730	B1	28-08-2001			NONE
EP 0575676	A	29-12-1993	SG	52398 A1	28-09-1998
			EP	0575676 A1	29-12-1993
			CA	2099171 A1	27-12-1993
			DE	69223776 D1	05-02-1998
			DE	69223776 T2	16-07-1998
			JP	6303116 A	28-10-1994
			US	5455522 A	03-10-1995
US 4825099	A	25-04-1989	NONE		
US 5021730	A	04-06-1991	US	5525897 A	11-06-1996
			US	5519309 A	21-05-1996
			US	5266887 A	30-11-1993
JP 07146726	A	06-06-1995	NONE		